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National Canners Association

New York Convention
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Address of Dr. Carl L. Alsberg, Chief of Bureau of Chemistry,
Washington, D. C.

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Address of Dr. Carl L. Alsberg, Chief of Bureau of Chemistry, Department of Agriculture, before the Convention of the National Canners Association at New York, Feb. 11, 1915.

Ladies and Gentlemen, Mr. President:

Last year I had the privilege of addressing this Association in Baltimore, and at that time I had the opportunity to point out to you that not only the consumer benefited by the rigid enforcement of the Food and Drugs Act, but also the honest manufacturer, who was protected from unfair competition—I believe I used that term at that time—and since then that phrase has become more widely used.

I made appeal to you to look at the law from that angle, because I felt sure that those of you who had not looked at it from that angle, and who stopped to think, would see that the law was quite as valuable to you in protecting you from the unfair competition of some of your rivals as it was in protecting the consumer from fraud and from objectionable, deleterious food products.

This year I am going to talk, if you will bear with me kindly, on an entirely different matter. I feel that this year I am acquainted with you, that we can have a little family talk about certain matters that are of the greatest interest and importance to all of us. I am going to talk on some rather technical matters, which are of interest primarily to you gentlemen as manufacturers. I may say that I proposed to discuss hygienic matters.

First is the question of sanitation in the factory. I know that many of you have plants which vie with a hospital ward in cleanliness and neatness; I know also that some of you have plants which do not reach this ideal by a good deal. My experience and the experience of the inspectors who assist me in the work of the Bureau has been that when the conditions in one of your plants are not what they should be from the sanitary or cleanliness point of view, it is, as a rule, the result of a misunderstanding of what the term "cleanliness" means, and not any willful intent to put out a product that is anything but clean, as manifestly it is to nobody's advantage to put out a product that is not clean.

The canning industry is a new industry; it is not much over half a century, if it has really half a century of history, since with many other food industries it was transferred from the home kitchen to the factory. The introduction of steam has resulted in the complete revolution of our industrial life. They used to card and spin wool at home; it is now done in the factory. They used to weave linen in the home; it is now done in the factory.

This industrialization has not been limited to the manufacturing

of machinery, clothing and similar objects of use, but it has spread and is ever spreading to the manufacture of food. We have been for half a century or more undergoing a revolution in our methods of feeding ourselves, and more and more of the processes which were formerly done in the home are being transferred to the factory.

Many of us unquestionably regret that condition, but regrets will not stop the course of events and we must be prepared to face a continual change and revolution in the manufacture of food products. There will continue to be a larger and larger percentage of them manufactured in the factory, and a smaller and smaller percentage of them manufactured in the home.

This change which has been going on in the manufacture of food products is a fairly recent one, and the transfer has been from the kitchen of the home to the factory, and naturally, in making that transfer, the manufacturer applied the same methods that were used in the home to the factory. Now, those methods are not applicable. What is cleanliness in the kitchen, what is good enough for the housewife, from the point of cleanliness, is not good enough for the factory. (Applause.)

It is perfectly natural that the average man in your line of business is inclined to think that what is good enough in his wife's kitchen is good enough for his factory, and to realize that is not the case is to understand what the real principles of cleanliness are—the principles that have become a matter of routine in the hospital ward. I do not mean to imply that you have to have your buildings without any corners and have disinfecting apparatus around, but in a way the same principles that are applied in the hospitals must be applied in your factories. They are perfectly simple and perfectly inexpensive to apply if every one of you were thoroughly familiar with them.

There is an industry which has had a history somewhat similar to the history of your industry, only its change from the home and the kitchen to the factory happened some centuries ago. That industry is the industry of brewing. Some hundreds of years ago, beer was manufactured at home; it was a house industry. Every farm house in Europe, at least in Northern Europe, grew its own barley, made its own malt, grew its own hops, made its own beer. But economic reasons forced that industry to change from a house industry to a factory industry some centuries ago. In consequence, that industry has some centuries of history behind it which you gentlemen as yet have not, and in the course of those centuries of history, that industry has learned exactly what is necessary for it to do in order to put out a cleanly product.

Now, this industry had a greater incentive for absolute cleanliness in the factory than the canning industry has had till recently, and that incentive is that any slop or lack of cleanliness in a brewery ruins the product, spoils the flavor.

Brewing depends upon the growth of a very definite plant in the extract of malt, which is known to the brewer as wort, and which, after it has become fermented by this plant growing in it, is termed "beer." Now, beer is made by the growth of this plant, yeast, in the extract of malt, and it is necessary that only this one species of plant

should grow in the malt extract. The brewer is constantly subjected to the danger that some other plants may grow in his wort, and then he gets a product which is bad in flavor and unsalable. Only by exercising the greatest degree of cleanliness to prevent the infection of his product with some strange yeast or mould can he be sure of putting out a uniform and satisfactory product. As a result of this absolute necessity of having only what is termed a pure culture of yeast growing in the wort in order to get the proper beer, the brewing industry in the course of centuries has developed a certain definite technique of construction which will enable brewers to keep their plant and every part of it clean from undesirable yeasts, enabling them to turn out a uniform product.

It has been the work of centuries. There is not now the same need to take centuries to develop in any other industry the same kind of technique, because we have made scientific progress today which enables us to do in a few years what was learned in centuries by the trial and failure method.

Until a few years ago, there was really no incentive for the canner to develop a technique similar to that which the danger of losing his beer through spoilage compelled the brewer to develop, but the passage of the Food and Drugs Act gave to those of the canners that were paying no attention to this matter the necessary incentive. I am glad to say there has been an enormous stride forward in sanitation in canning factories within the last decade. It is really an exceedingly simple matter to observe the necessary precautions in a plant. I would like to illustrate by a concrete example. Some time last summer we had a communication from a manufacturer of pulp. He said he had a model plant, he bought the best tomatoes, he sorted them thoroughly, but his bacteriologist, who was controlling his plant, turned in reports that he would rather not tell us about, because if he told us we might seize some of his goods.

Following the policy of the department, that it is better to make prosecutions unnecessary than to make a record of a maximum number of notices of judgment, we sent an expert to this man's factory. It was quite evident the man was straight and thoroughly sincere, and that he really was doing the best that he could, but nevertheless turning out a product of which he was ashamed.

Our expert reached the plant. He found that looking at it superficially, it seemed an excellent plant; the sorting was being done adequately, and I would like to digress here a moment and say that in the making of pulp, or catsup, the most important step in the whole process, as far as we can see, is adequate sorting, is having sufficient help to do the sorting so that you are quite sure that very little decayed material gets into your product.

An investigation of this man's equipment showed that his crushing box was not being properly cleaned. Although superficial inspection showed that it seemed to be clean, it revealed a series of wooden piping that you could not get at, through which the pulp was pumped or allowed to flow; it revealed tanks placed under machines where you could not see whether they were clean or not, that you could not get at; and it revealed a lack of stiff brushes and similar ordinary mechanical cleaning devices in the factory. Our expert took a sample of the material that covered the surfaces of the crushing box—not

the product that was going through the crusher, but the material that was clinging to the sides of the box—and found that the number of moulds in that material was infinite, which was his way of stating that they were more than he could count under the microscope; that the yeast count was five hundred and nineteen. This is not in the pulp that was going through, but this is in the material that clung to the wall of the crusher. He reported that there were one and a half million bacteria in that material and also a certain number, a very considerable number, of nematodes, minute microscopic worms which occur in enormous quantities in water and in soil. Sometimes a single cubic foot of soil may contain some millions of these tiny animals. They are to the soil and to water perhaps what insects are to the atmosphere, they may be so numerous. He found that the material that he could scrape off the wooden pipes had an enormous number of moulds, over four thousand yeasts, and over a million bacteria. He found that the catsup which was being made contained a count of 45 moulds, 75 spores and about 50,000,000 bacteria.

Then he showed the men how to keep the place clean; he had them take the tanks and make them removable so that you could get at the inside of them and see what you were doing; he made them arrange the pipes so that they could be cleaned. The total expenditure of the whole thing was probably not \$25, and the amount of labor that was necessary was entirely insignificant, very much less than they had used in keeping their place clean before he came. They had been applying their efforts to all the places in the plant that were easy to get at, and overlooking the dark corners and the covered places.

The day after they had their first cleaning, the count was worse, the reason, of course, perfectly plain—they had loosened everything up so that a certain percentage of the material clinging to the wall of the tanks and the pipes was washed off. The second day the count came back to what it was before the cleaning had taken place. On the third day they were down to 30 moulds, 21 yeasts and spores, and 9,000,000 bacteria. And after they cleaned 15 or 20 times, the usual routine of cleaning, they were down to 15 moulds, 7 yeasts or spores, and 7,000,000 bacteria. The total cost was not \$50, and the total amount of labor was no more than they had been putting in before; in fact, it was less work to clean when it was properly done, and the plant had been revamped so that every dark corner and every hidden spot could be gotten at than before.

We feel confident that most of the trouble that you gentlemen have been having in connection with your work, let us say in connection with tomato pulp, can come from two sources—one is that you have not sorted properly, and the other is that your plant is so constructed that you cannot get at every dark corner, into every pipe, and keep it clean. It is very inexpensive to readjust a plant so that the problem of labor that is involved in cleaning a plant, is no greater and probably less than in a plant in which everything is screwed down, and you cannot take anything out and get at it.

Another difficulty that you gentlemen are having is based on the fact that there are only a limited number of people who might be called professional canners. Until recently, almost anybody, as far as I am informed, who had some administrative ability might be used as a manager of a cannery. It strikes me that yours is a profession as truly as almost any other, that sooner or later your industry will have to come down to the point of training people for the management of

the canneries. To go back again to the brewers. If they keep their breweries clean it is because if they do not they ruin their product and lose their trade. The brewers have found that if they want to have people run their plants, they have to train them, and brewing schools have been old institutions. They have been training brewers abroad, I do not know how long, but certainly for 75 years. There are brewing schools in this country. Now, I do not think anyone of us will for a moment believe that it takes less skill and less brains to make a series of canned goods than to make beer. I for one think that it takes more skill to run a cannery, putting out a large number of different products, than to run a brewery, which brews perhaps only one or two products. I feel confident that the time will come when you gentlemen will want to employ people whom you can train for your business, when you will not want to experiment with men who have not been trained to run your plants. The need for such men is particularly great because you cannot centralize the canning business, since you have to be where the products are to can. You cannot build one enormous plant that will handle the product of a whole state; you have to have smaller plants scattered where your raw material is. It appears to me that one of the things you need is to have people who are trained for your work. I do not believe that the problem of training those people will be solved by getting a university or an agricultural college or a technical school to give courses in industrial canning. You gentlemen do not want scientists for your plants; you need the help and advice of the scientists, but you cannot employ a scientist for every tomato pulp plant that you happen to have. You do not need trained chemists and bacteriologists for every plant. You need in your industry, as far as I can see, men of the same type of training and education as the average brewmaster; a man who has learned how to make beer, but a man who need not necessarily be trained to make a chemical analysis. You need chemists, you need bacteriologists; you do not need one for each plant everywhere. Now, the brewing schools have usually centered around the trade laboratory. They have them in Europe, on the Continent as well as in England, and I should not wonder that if some day you will find it necessary in connection with your scientific laboratory to establish a training school for the men who will be the practical men to run your plants. I think that you would get better men for that particular purpose than if you expected to get them from a university.

The third subject that I wish to discuss is the question of the value of canned goods in the diet. I think I see in scientific literature of the day a certain amount of information which, in the hands of the laymen, might be converted unintentionally into misinformation. There is in the scientific literature at the present time a great deal of active work being done on certain diseases such as scurvy, for example, and the question has been raised by scientists what effect canned goods may have in such cases. We are confronted with a situation which is a good deal like the case of so-called polished rice. I hope you will pardon me for digressing a moment. There is a disease in those portions of the tropics where rice is the main article of diet called "beri-beri," which is characterized by paralysis of the nerves that lead to the extremities, weakness of the heart and dropsy. Now, it has been found out that if you do not eat anything else but polished rice, that is to say, rice from which the outer layer has been removed, you get "beri-beri." From that it has been assumed by those who did not full understand the situation, that if we here in America eat polished rice, we run a danger of getting beri-beri. Now, I do not know any-

body in the United States, unless it be a Chinaman or a Japanese, who eats practically nothing but rice, and I do not know of any case of beri-beri that has ever occurred in the United States excepting on the part of the few negroes from the rice plantations in South Carolina, who had idiosyncrasies of taste and lived on very little but rice and pork. If we were rice eaters instead of consuming less rice than most of the civilized nations—England consumes 25 per cent more rice per capita than we do—there might be some sense in the argument that the sale of polished rice in the United States is injurious to health. Rice for us is only a vegetable; we eat it as we eat potatoes, and no one is likely to get beri-beri because he has eaten polished rice. What we mean by polished rice is not what the Oriental means by polished rice. The Oriental calls rice that has had the hull removed a polished rice; we call a polished rice one that has had the hull removed and has been polished with glucose and talc. I am not discussing the coating but just the polishing.

There have been in the literature some uncritical statements about canned goods, that canned goods were not entirely wholesome because in the process of canning certain valuable ingredients may have been altered. Whether that be true or not, the argument is no more binding in the case of canned goods than it is in the case of your polished rice for the United States. The argument only holds where canned goods are the main article of diet—but that is true of any diet in which a single definite article is the main or sole article of diet.

The fishermen of Newfoundland become diseased in the course of the winter because they live almost exclusively on wheat flour. Are we going to cease eating wheat flour because if you eat nothing but wheat flour you are going to be sick? That fact is that no diet that is one-sided, that no diet which lacks variety, that no diet which lacks change, is a wholesome diet; and in making it possible to vary the diet, to give a wide range of foods, the canning industry has done as much as any industry because it has made it possible to vary the diet at all seasons of the year and under all conditions.

The psychic factor in diet is one of the most important factors that we have to deal with. It is not for nothing that we put on, in some parts of the world, our best clothes when we go down to dinner. The psychic effect of the expectation of something good to eat, as it is vulgarly expressed, "watering of the mouth," is a real and valuable physiological phenomena, and so the variation in the diet is one of the most important things in keeping the public, the average man, in sound and good health. And canned goods in connection with refrigeration are the two most important factors in making this variation in the diet possible in winter in strange corners of the earth, and in times of stress, such as the Belgians, for example, are undergoing today. A century ago even had we had steam transportation and steam vessels that cross the ocean in the time that they do now, it would have been quite impossible to have afforded the Belgians such measure of relief as they have been afforded today. But such an industry as that of canning, of refrigeration, of dessication, has made it possible to take care of such emergencies, and the famines which were a common thing in the Middle Ages we shall never see again.

Those are the three points that I wish to present to you gentlemen in this talk. The first, it is a very simple thing to keep your factory



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in such a shape that you will have no trouble from contamination with micro-organisms; the second, that you need some machinery to train your people to run your factories for you; and the third, that you need not be afraid in regard to the status of your problems in the diet, since they make the varied diet possible, which is one of the most important things in nutrition that we have to look out for. I thank you very much. (Applause.)

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